CLAIMS

What is claimed is:

1. A projection system comprising:

a light source emitting a beam;

a rectilinearly reciprocating cylindrical lens array which advances color beams along different paths upon reciprocation, so as to scroll the color beams;

an optical separator which separates the beam emitted from the light source into color beams according to wavelength;

a light valve which receives the scrolled color beams transmitted by the cylindrical lens array and forms a color image by turning pixels on or off according to an input image signal; and

a projection lens unit which magnifies the color image formed on the light valve and projects the magnified color image on a screen.

2. The projection system of claim 1, further comprising a driving unit which drives the cylindrical lens array.

3 . The projection system of claim 1, wherein the driving unit comprises.

a guide bracket supporting and guiding the cylindrical lens array;

a cam coupled to the cylindrical lens array to convert rotational motion thereof into reciprocating rectilinear motion of the cylindrical lens array; and

a motor which rotates the cam.

4 . The projection system of claim 3, wherein the cam has a cam groove formed one of along a sidewall of the cam and on an upper surface of the cam.

5 . The projection system of claim 4, wherein the cam groove has a shape that causes the cam to reciprocate the cylindrical lens array at least one time per rotation of the cam.

6 . The projection system of claim 2, wherein the cylindrical lens array is a plate having plural lens cells whose widths are the same as the widths of the pixels of the light valve .

7. The projection system of claim 2, wherein a scrolling speed of the cylindrical lens array is synchronized with an operating frequency of the light valve.

8 . The projection system of claim 2, wherein an increase in one of the number of the plurality of lens cells and the reciprocating speed of the cylindrical lens array increases the scrolling speed.

9 . The projection system of claim 2, wherein a decrease in one of the number of the plurality of lens cells and the reciprocating speed of the cylindrical lens array increases the scrolling speed.

10 . The projection system of claim 2, wherein an elastic member is disposed between the cylindrical lens array and the guide bracket so as to provide recovery force in an axial direction urging the cylindrical lens array to an original position.

11 . The projection system of claim 2, further comprising a pair of fly-eye lenses disposed on a light path between the cylindrical lens array and the light valve.

12. The projection system of claim 11, wherein the first and second fly eye lenses have a plurality of 2 dimensionally arranged lens cells.

13 . The projection system of claim 11, further comprising a relay lens disposed on a light path between the fly-eye lens pair and the light valve to focus an incident color beam on a respective color area of the light valve.

14 . The projection system of claim 2, wherein the optical separator includes first through third dichroic filters which are inclined at different angles with respect to incident light, split the incident light according to wavelength ranges, and advance the color beams at different angles and the cylindrical lens array is disposed on a light path between the optical separator and the light valve.

15 . The projection system of claim 2, wherein the optical separator includes first through third dichroic filters which are inclined at different angles with respect to incident light, split the incident light according to wavelength ranges, and advance the color beams at different angles and the cylindrical lens array is disposed on a light path between the light source and the optical separator.

16 . The projection system of claim 2, wherein the processing of the input image signal by the light valve when the cylindrical lens array rectilinearly moves in a forward direction is different from when the cylindrical lens array rectilinearly moves in a backward direction, so that a color image can be obtained upon forward and backward movement of the cylindrical lens array.

17. The projection system of claim 2, wherein the cylindrical lens array reciprocates at a constant speed and direction.

18 . The projection system of claim 1, wherein an increase in one of the number of the plurality of lens cells and the reciprocating speed of the cylindrical lens array increases the scrolling speed.

19 . The projection system of claim 1, wherein a decrease in one of the number of the plurality of lens cells and the reciprocating speed of the cylindrical lens array increases the scrolling speed.

20 . The projection system of claim 1, further comprising a pair of fly-eye lenses disposed on a light path between the cylindrical lens array and the light valve.

21. The projection system of claim 20, wherein the first and second fly eye lenses have a plurality of 2 dimensionally arranged lens cells.

22. The projection system of claim 20, further comprising a relay lens disposed on a light path between the fly-eye lens pair and the light valve to focus an incident color beam on a respective color area of the light valve.

23 . The projection system of claim 1, wherein the optical separator includes first through third dichroic filters which are inclined at different angles with respect to incident light, split the incident light according to wavelength ranges, and advance the color beams at different angles and the cylindrical lens array is disposed on a light path between the optical separator and the light valve.

24 . The projection system of claim 1, wherein the optical separator includes first through third dichroic filters which are inclined at different angles with respect to incident light, split the incident light according to wavelength ranges, and advance the color beams at different angles and the cylindrical lens array is disposed on a light path between the light source and the optical separator.

25 . The projection system of claim 1, wherein the processing of the input image signal by the light valve when the cylindrical lens array rectilinearly moves in a forward direction is different from when the cylindrical lens array rectilinearly moves in a backward direction, so that a color image is determined upon forward and backward movement of the cylindrical lens array.

26. The projection system of claim 1, wherein the cylindrical lens array reciprocates at a constant speed and direction.

27. The projection system of claim 1, wherein the optical separator separates the beam into three color beams, one color beam having a wavelength corresponding to red, one color beam having a wavelength corresponding to green, and one color beam corresponding having a wavelength corresponding to blue.

28. A lens array having a plurality of cylindrical lens cells arranged to form a plate and to advance light rays passing through the lens cells along different paths upon reciprocation of the cylindrical lens array.

29. A method of projecting an image, comprising:

emitting a light beam;

separating the light beam into a plurality of color beams according to wavelength;

scrolling the color beams by reciprocating an optical element having a plurality of lens cells arranged to form a plate;

focusing the color beams onto a light valve and turning pixels of the light valve one of on and off according to a received image signal so as to form a color image;

magnifying the color image; and

projecting the magnified color image onto a screen.

30. A projection system comprising:

a light source emitting a beam;

only one rectilinearly reciprocating cylindrical lens array which advances color beams along different paths upon reciprocation, so as to scroll the color beams;

an optical separator which separates the beam emitted from the light source into color beams according to wavelength;

a light valve which receives the scrolled color beams transmitted by the cylindrical lens array and forms a color image by turning pixels on or off according to an input image signal; and

a projection lens unit which magnifies the color image formed on the light valve and projects the magnified color image on a screen.